C. GEOMETRY

***Content Standard**:* Students in Wisconsin will be able to use geometric concepts, relationships, and procedures to interpret, represent, and solve problems. [Note: Familiar mathematical content dealing with measurement of geometric objects (for example, length, area, volume) is presented in "D. Measurement."]

***Rationale*:** Geometry and its study of shapes and relationships is an effort to understand the nature and beauty of the world. While the need to understand our environment is still with us, the rapid advance of technology has created another need: to understand ideas communicated visually through electronic media. For these reasons, educated people in the 21st Century need a well-developed sense of spatial order to visualize and model real-world* problem situations.

***Performance Standards*: By the end of grade four, students will:**	***Sample Alternate Performance Indicators:* (1-3 per standard)**	***Sample Performance Activities/Tasks:* (1-2 per indicator)**	***Sources of Data***
C.4.1. Describe two- and three-dimensional figures (e.g., circles, polygons, trapezoids, prisms, spheres) by[2] • naming them • comparing, sorting, and classifying them • drawing and constructing physical models to specifications • identifying their properties (e.g., number of sizes or faces, two- or three-dimensionality, equal sides, number of right angles) • predicting the results of combining or subdividing two-dimensional figures • explaining how these figures are related to objects in the environment	1. Recognize and identify figures by naming and classifying[2]	1.a. Classify several different shapes and figures according to identified properties. Use L_1 or $L_{2\ (2)}$ 1.b. Use tan grams to demonstrate subdividing two-dimensional figures (e.g., use two right triangles to make one square)(2) 1.c. Use tan grams to complete pictures related to objects in the environment (e.g., flowers, a house, or a dog)(2)	

C.4.2. Use physical materials and motion geometry (e.g., slides, flips, and turns) to identify properties and relationships, including but not limited to[1] • symmetry • congruence • similarity	1. Use physical materials and motion geometry (e.g., slides, flips, and turns) to identify properties and relationships, including but not limited to[1] • symmetry • congruence • similarity	1.a. Identify the properties and relationships of two cups with different heights but the same diameter. Using manipulative, demonstrate symmetry, congruence, and similarity (manipulatives: solid and plane geometric shapes mirror)(2) 1.b. Fit a correct shape into an appropriate corresponding opening. Flip, turn, and slide figures to identify relationships(2) 1.c. Trace or draw and label geometric shape(1)	
C.4.3. Identify and use relationships among figures, including but not limited to[1] • location (e.g., between, adjacent to, interior of) • position (e.g., parallel, perpendicular) • intersection (of two-dimensional figures)	1. Identify and use relationships among figures, including but not limited to[1] • location (e.g., between, adjacent to, interior of) • position (e.g., parallel, perpendicular) • intersection (of two-dimensional figures)	1.a. Create a poster from magazine pictures to illustrate five of the mentioned terms(2)	
C.4.4. Use simple two-dimensional coordinate systems to find locations on maps and to represent points and simple figures[1]	1. Use simple two-dimensional coordinate systems to find locations on maps and to represent points and simple figures[1]	1.a. On a map of Wisconsin, identify three state parks from given coordinates and the shape formed when traveling to the locations(2)	
***Performance Standards*: By the end of grade eight, students will:**	***Sample Alternate Performance Indicators:* (1-3 per standard)**	***Sample Performance Activities/Tasks:* (1-2 per indicator)**	***Sources of Data***
C.8.1. Describe special and complex two- and three-dimensional figures (e.g., rhombus, polyhedron, cylinder) and their component parts (e.g., base, attitude, and slant height) by [2] • naming, defining, and giving	1. Describe special and complex two- and three-dimensional figures (e.g., rhombus, polyhedron, cylinder) and their component parts (e.g., base, attitude[2] • naming, defining, and giving examples • comparing, sorting, and classifying	1.a. Copy pictures of two- and three-dimensional figures (e.g., rhombus, polyhedron, cylinder) and properly identify them, labeling the component parts. Figures could also be constructed with straws and twist ties and physically sorted according to properties(1) 1.b. Compare and contrast the figures(2)	

examples • comparing, sorting, and classifying them • identifying and contrasting their properties (e.g., symmetrical, isosceles, regular) • drawing and constructing physical models to specifications • explaining how these figures are related to objects in the environment	them • identifying and contrasting their properties (e.g., symmetrical, isosceles, regular) • drawing and constructing physical models to specifications • explaining how these figures are related to objects in the environment		
C.8.2. Identify and use relationships among the component parts of special and complex two- and three-dimensional figures (e.g., parallel sides, congruent faces)[2]	1. Identify and use relationships among the component parts of special and complex two- and three-dimensional figures (e.g., parallel sides and congruent faces)[2]	1.a. Match similar figures from among a group of figures, naming congruent angles and sides(1)	
C.8.3. Identify three-dimensional shapes from two-dimensional perspectives and draw two-dimensional sketches of three-dimensional objects preserving their significant features[2]	1. Identify three-dimensional shapes from two-dimensional perspectives and draw two-dimensional sketches of three-dimensional objects preserving their significant features[2]	1.a. Given a net of a cube, cut it out and fold on each line to form the cube, then draw the resulting figure(2)	
C.8.4. Perform transformations on two-dimensional figures and describe and analyze the effects of the transformations on the figures[2]	1. Identify three-dimensional shapes from two-dimensional perspectives and draw two-dimensional sketches of three-dimensional objects preserving their significant features[2]	1.a. Given grid paper, copy a shape onto it, then double the size of the grid to enlarge the picture(2) 1.b. Slide, rotate, or reflect a two dimensional sketches of a three-dimensional object(2)	
C.8.5. Locate objects using the rectangular coordinate	1. Use the rectangular coordinate system to locate objects[1]	1.a. On a map, draw a large rectangle, draw its diagonals, and find a city where the diagonals cross(2)	

system[1]			
***Performance Standards*: By the end of grade twelve, students will:**	***Sample Alternate Performance Indicators:* (1-3 per standard)**	***Sample Performance Activities/Tasks:* (1-2 per indicator)**	***Sources of Data***
C.12.1. Identify, describe, and analyze properties of figures, relationships among figures, and relationships among their parts by • constructing physical models • drawing precisely with paper and pencil, hand calculators, and computer software • using appropriate transformations (e.g., translations, rotations, reflections, enlargements) • using reason and logic	1. Identify, describe, and analyze properties of figures, relationships among figures, and relationships among their parts by • constructing physical models • drawing precisely with paper and pencil, hand calculators, and computer software • using appropriate transformations (e.g., translations, rotations, reflections, and enlargements) • using reason and logic	1.a. Draw an Isosceles triangle with 50º, 50º, and 80º angles, then draw its reflection at 180º. Identify the coordinate at 80º. Observe what happens when performing a rotation	
C.12.2. Use geometric models to solve mathematical and real-world problems	1. Use geometric models to solve mathematical and real-world problems	1.a. Solve problems of the following type: Tom is building a side wall 15'X3'X4". How much concrete does he need if concrete is sold by cubic yards?	
C.12.3. Present convincing arguments by means of demonstration, informal proof, counterexamples, or any other logical means to show the truth of • statements (e.g., "these two triangles are not congruent") • generalizations (e.g., "the Pythagorean theorem holds	1. Use geometric models to solve mathematical and real-world problems	1.a. Solve problems of the following type: *Given*: LC = LF, and AC = DE *Prove*: ❑ ABC = ❑ DEF	

for all right triangles")			
C.12.4. Use the two-dimensional rectangular coordinate system and algebraic procedures to describe and characterize geometric properties and relationships such as slope, intercepts, parallelism, and perpendicularity	1. Use geometric models to solve mathematical and real-world problems	1.a. Graph the following data on a rectangular coordinate system Plumber 1 hours/cost ($) 1@70 3@170 5@270 Plumber 2 hours/cost ($) 1@100 2@150 4@250 What is the base fee and hourly rate for each plumber? Will hiring plumber one ever cost more than hiring plumber 2?	
C.12.5. Identify and demonstrate an understanding of the three ratios used in right-triangle trigonometry (sine, cosine, tangent)	1. Identify and demonstrate an understanding of the three ratios used in right-triangle trigonometry (sine, cosine, and tangent)	1.a. Use sine to find the height of a kite